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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/633,882	08/07/2000	MIKKEL THORUP	106989	3281

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EXAMINER

BRUCKART, BENJAMIN R

ART UNIT	PAPER NUMBER
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2155

DATE MAILED: 10/08/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/633,882

Applicant(s)

THORUP ET AL.

Examiner

Benjamin R Bruckart

Art Unit

2155

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

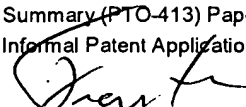
Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: 

Detailed Action

Claims 1-20 are pending in this Office Action.

Information Disclosure Statement

The information disclosure statement filed on paper 6 has been considered.

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application-by-application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:
Non-initialed and/or non-dated alterations have been made to the oath or declaration. See 37 CFR 1.52(c).

Formal Drawings

The formal drawings received on 7/6/01 have been entered.

Specification

The disclosure is objected to because of the following informalities:

Page 2, lines 13 and 16 have missing application numbers.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,854,903 by Morrison et al ("Morrison") in view of Frigioni et al ("Experimental Analysis of Dynamic Algorithms for the Single Source Shortest Paths Problem") ("Applicant IDS") ("Frigioni").

The Morrison reference teaches a method for controlling traffic flow in a network, comprising: (Morrison: Abstract)

generating a set of control weights relating to network traffic flow (claim 1)(Morrison: col. 6, lines 42-44) and

controlling traffic flow in the network using the set of control weights. (claim 1)(Morrison: col. 7, lines 39-44)

The Morrison reference does not explicitly state different approaches to solving the routing problems.

Frigioni teaches a best-neighbor approach (claim 1)(Page 6, 1st Paragraph; the Dijkstra algorithm)

Frigioni further teaches that using the dynamic Dijkstra algorithm requires minimum computation by not computing the entire table from scratch at each iteration. (Frigioni, Page 1, 2nd Paragraph)

Therefore it would have been obvious at the time of the invention to one of ordinary skill in the art to create the method of controlling traffic flow in a network as taught by Morrison while employing a dynamic Dijkstra algorithm as taught by Frigioni in order to minimize computation by not computing the entire table from scratch at each iteration. (Frigioni, Page 1, 2nd Paragraph)

Claims 2-8 and 10-12 are rejected under the same rationale given above. In the rejections set forth, the examiner will address the additional limitations and point to the relevant teachings of Morrison and Frigioni.

Regarding claim 2, the method of claim 1, wherein the best-neighbor approach is a modified the best-neighbor approach that uses at least an anti-cycling technique. (Frigioni: Page 6, 1st Paragraph; the Dijkstra algorithm is inherently anti-cycling)

Regarding claim 3, the method of claim 1, wherein the best-neighbor approach is a modified the best-neighbor approach that uses at least an impatience technique. (Frigioni: Page 5, 5th Paragraph)

Regarding claim 4, the method of claim 1, wherein generating the set of control weights is further based on at least a diversification process. (Morrison: col. 9, lines 46-60; where new set of virtual path routing are the new performance regions)

Regarding claim 5, the method of claim 4, wherein the diversification process is a limited range diversification process. (Morrison: col. 9, lines 46-60; where threshold amount is the limit changes are based upon)

Regarding claim 6, the method of claim 2, wherein the best-neighbor approach is a modified the best-neighbor approach that uses at least an impatience technique. (Frigioni: Page 5, 5th Paragraph)

Regarding claim 7, the method of claim 6, wherein generating the set of control weights is further based on at least a diversification process. (Morrison: col. 9, lines 46-60; where new set of virtual path routing are the new performance regions)

Regarding claim 8, the method of claim 7, wherein the diversification process is a limited range diversification process. (Morrison: col. 9, lines 46-60; where threshold amount is the limit changes are based upon)

Regarding claim 10, the method of claim 3, wherein generating the set of control weights includes:

generating a set of first weights; (Morrison: col. 9, lines 38-40)

evaluating a first traffic cost (network blocking probabilities) based on at least the set of first weights; (Morrison: col. 9, lines 6 and 7; col. 12, lines 1-9)

generating a set of second weights based on the set of first weights (Morrison: col. 9, lines 40-44) and the best-neighbor approach (Page 6, 1st Paragraph; the Dijkstra algorithm);

evaluating a second traffic cost based on at least the set of second weights; and
(Morrison: col. 9, lines 40-44)

selecting the control weights based on at least the first traffic cost and the second traffic costs. (Morrison: col. 9, lines 47-55)

Regarding claim 11, the method of claim 10, wherein generating the set of second weights is further based on at least a rarefied neighborhood search. (Morrison: col. 9, lines 40-44; col. 18, lines 50-59)

Regarding claim 12, the method of claim 10, wherein generating the set of second weights is further based on a dynamic graph technique. (Frigioni: Page 6, 2nd Paragraph)

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,854,903 by Morrison et al ("Morrison") in view of Frigioni et al ("Experimental Analysis of Dynamic Algorithms for the Single Source Shortest Paths Problem")("Applicant IDS") ("Frigioni") in further view of U.S. Patent No. 6,411,603 by Ahuja.

The Morrison reference teaches a linear cost function $\phi = \sum \phi_a |a)$. The Morrison reference lacks two or more segments that are substantially convex.

Ahuja teaches a simplified cost function that is piece-wise linear that has two or more segments that is substantially convex (Ahuja: col. 3, eqn 2, eqn 3, lines 31 and 32)

Morrison further teaches that the important of speed for the solution to link analysis equations will be easy to appreciate when one considers that each network design and optimization problem requires many network solutions. (Morrison: col. 7, lines 5-11)

Therefore it would have been obvious at the time of the invention to one of ordinary skill in the art to replace the linear cost function of a network as taught by Morrison with Ahuja's cost function because it is a simpler design to implement and takes less computing time (Morrison: col. 7, lines 5-11).

Claims 13-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,854,903 by Morrison et al ("Morrison") in view of Frigioni et al ("Experimental Analysis of Dynamic Algorithms for the Single Source Shortest Paths Problem") ("Applicant IDS") ("Frigioni").

The Morrison reference teaches an apparatus for controlling traffic flow in a network, comprising: (Morrison: Abstract)

a weight device that generates a set of control weights (Morrison: col. 6, lines 42-44) and at least one network node that receives one or more control weights of the set of control weights (Morrison: col. 1, lines 17-26; "nodes connected to each other"), and controls traffic flow in the network based at least the one or more control weights. (Morrison: col. 7, lines 39-44)

The Morrison reference does not explicitly state different approaches to solving the routing problems.

Frigioni teaches a best-neighbor approach (Page 6, 1st Paragraph; the Dijkstra algorithm)

Frigioni further teaches that using the dynamic Dijkstra algorithm requires minimum computation by not computing the entire table from scratch at each iteration. (Frigioni, Page 1, 2nd Paragraph)

Therefore it would have been obvious at the time of the invention to one of ordinary skill in the art to create the method of controlling traffic flow in a network as taught by Morrison

while employing a dynamic Dijkstra algorithm as taught by Frigioni in order to minimize computation by not computing the entire table from scratch at each iteration. (Frigioni, Page 1, 2nd Paragraph)

Claims 14-18 and 20 are rejected under the same rationale given above. In the rejections set forth, the examiner will address the additional limitations and point to the relevant teachings of Morrison and Frigioni.

Regarding claim 14, the method of claim 13, wherein best-neighbor approach is a modified best-neighbor approach that uses at least one of an anti-cycling mechanism (Frigioni: Page 6, 1st Paragraph; the Dijkstra algorithm is inherently anti-cycling) and an impatience mechanism (Frigioni: Page 5, 5th Paragraph).

Regarding claim 15, the apparatus of claim 14, wherein best-neighbor approach is a modified best-neighbor approach that uses at least an anti-cycling mechanism (Frigioni: Page 6, 1st Paragraph; the Dijkstra algorithm is inherently anti-cycling) and an impatience mechanism. (Frigioni: Page 5, 5th Paragraph).

Regarding claim 16, the apparatus of claim 13, wherein the weight device includes a diversification device that performs at least one diversification process. (Morrison: col. 9, lines 46-60; where new set of virtual path routing are the new performance regions)

Regarding claim 17, the apparatus of claim 16, wherein the diversification process is a limited range diversification process. (Morrison: col. 9, lines 46-60; where threshold amount is the limit changes are based upon)

Regarding claim 18, the apparatus of claim 15, wherein the weight device includes a diversification device that performs at least one diversification process. (Morrison: col. 9, lines 46-60; where new set of virtual path routing are the new performance regions)

Regarding claim 20, the apparatus of claim 15, wherein the weight device includes a diversification device that performs at least one diversification process. (Morrison: col. 9, lines 46-60; where threshold amount is the limit changes are based upon)

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,854,903 by Morrison et al ("Morrison") in view of Frigioni et al ("Experimental Analysis of Dynamic Algorithms for the Single Source Shortest Paths Problem")("Applicant IDS") ("Frigioni") in further view of U.S. Patent No. 6,411,603 by Ahuja.

The Morrison reference teaches a linear cost function $\phi = \sum \phi_a |a)$. The Morrison reference lacks two or more segments that are substantially convex.

Ahuja teaches an apparatus of claim 16, wherein the weight device includes a cost calculator that calculates at least the cost of at least one control weight of the set of control weights based on a piece-wise linear cost function having two or more segments substantially convex (Ahuja: col. 3, eqn 2, eqn 3, lines 31 and 32)

Morrison further teaches that the important of speed for the solution to link analysis equations will be easy to appreciate when one considers that each network design and optimization problem requires many network solutions. (Morrison: col. 7, lines 5-11)

Therefore it would have been obvious at the time of the invention to one of ordinary skill in the art to replace the linear cost function of a network as taught by Morrison with Ahuja's cost function because it is a simpler design to implement and takes less computing time (Morrison: col. 7, lines 5-11).

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

U. S. Patent No. 4,967,345 issued to Clark et al.

U. S. Patent No. 5,467,345 issued to Cutler et al.

U. S. Patent No. 5,729,692 issued to Qiu et al.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin R Bruckart whose telephone number is (703) 305-0324. The examiner can normally be reached on 8:30-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain Alam can be reached on (703) 308-6662. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0324.

Benjamin R Bruckart
Examiner
Art Unit 2155

brb
October 3, 2003


FRANTZ B. JEAN
PRIMARY EXAMINER